



## ***USER MANUAL***

# **SOPRANO**

## **User Manual**

### **History of modification of this document**

<b>Revision</b>	<b>Date</b>	<b>Product version</b>	<b>Modified sections</b>	<b>Comments</b>
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### **WARNING**

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***This document contains preliminary information about SOPRANO  
DIGIDIA reserves the right to make changes at any time without prior notice in order  
to improve design and supply the best possible product.  
This document includes some confidential information.  
It can not be copied, otherwise reproduced, translated into another language  
or transmitted without prior written authorisation from DIGIDIA.***

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# 1 INTRODUCTION

This document is the user manual for the SOPRANO product.

It provides general information about the SOPRANO product, and detailed performance characteristics.

This user manual is divided into 6 sections where the user can find all the necessary information for the installation, the usual operation and the first level maintenance of it.

- |  |  |
|--|--|
| <b>Section 1</b> – Introduction              | ⇒ This part gives a general presentation of this manual.   |
| <b>Section 2</b> – Product presentation      | ⇒ This part describes SOPRANO and its applications.  |
| <b>Section 3</b> – Features and performances | ⇒ This part provides detailed information about interfaces and operation of the SOPRANO                |
| <b>Section 4</b> – Getting started           | ⇒ This part provides information about installation, configuration and normal operation of the SOPRANO |
| <b>Section 5</b> – Maintenance               | ⇒ This part explains how to make first level maintenance.  |
| <b>Section 6</b> – Appendix                  | ⇒ The appendixes give additional detailed information about the SOPRANO and its operation.             |

## 2 PRODUCT PRESENTATION

SOPRANO belongs to the DRM product line developed by DIGIDIA.

The digital modulator SOPRANO provided by DIGIDIA is fully compliant to the DRM standard and is specially designed for commercial networks. This device performs the channel encoding process and the OFDM modulation of a MDI (Multiplex Data Interface) transport stream (IP stream).

SOPRANO is a DRM Modulator, which uses digital modulation to ensure the highest quality of the output signal. One single unit allows to easily feed an AM transmitter with an amplitude signal output available on a XLR connector and a carrier signal output available on a BNC connector as a standard feature. Delays and levels can therefore be adjusted using the graphical user interface. As an option, a digital I/Q output on a XLR connector can also be available.

The SOPRANO DRM Modulator accepts the SFN process, which allows to setup single frequency networks with use of a SFN adapter located in the DRM content server. In SFN mode, the SOPRANO DRM Modulator is locked on a stable 10 kHz reference coming from its internal GPS receiver.

As an option, the SOPRANO DRM Modulator is able to operate in simulcast mode (multiple channels) in order to broadcast AM and DRM programmes using the same transmitter.

All control and monitoring of the SOPRANO DRM Modulator is done through an Ethernet link and using Internet Explorer running on any kind of computer. Alarms are monitored on front face LEDs and on a rear panel connector as relay contacts. Alarms can also be controlled and monitored by any standard SNMP managers (standard MIB).

As an option, basic setup and monitoring functions can be performed using a LCD available on the front panel.

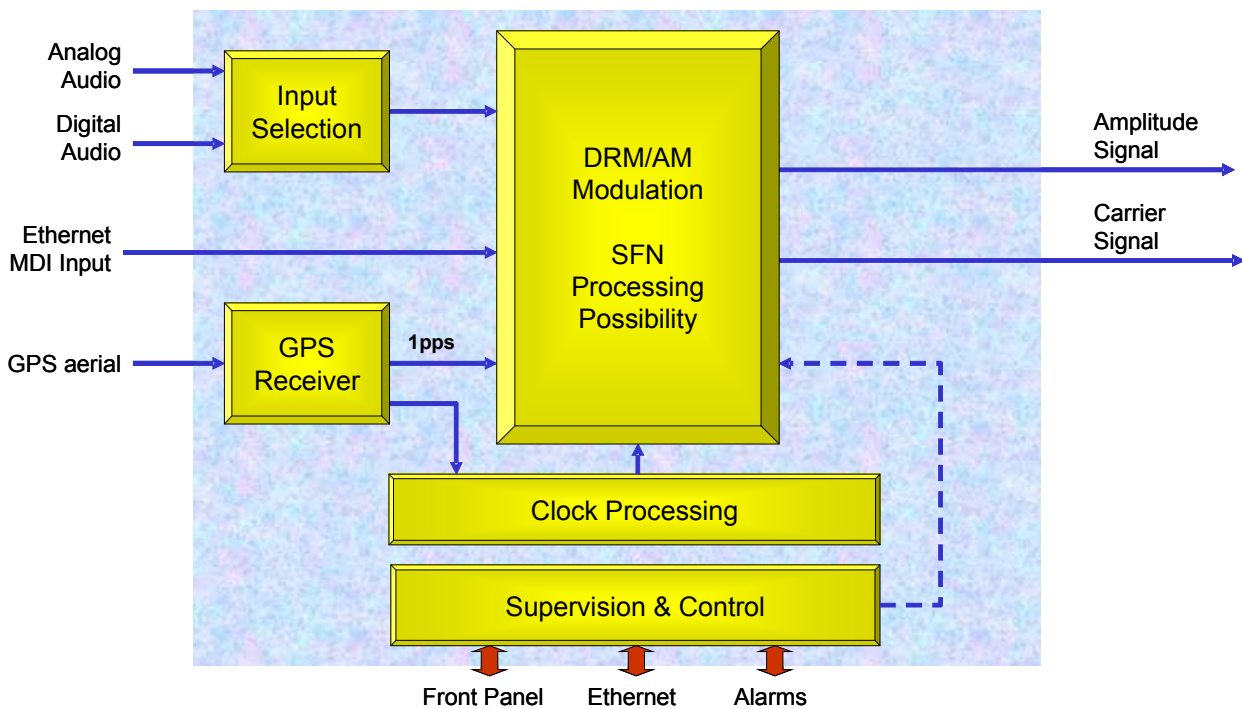
SOPRANO includes a high-density electronic board packaged in a 1U 19" rack and gives to the user, guarantees of reliability and robustness against severe environment including EMC constraints.

## 3 FEATURES AND PERFORMANCES

### 3.1 Generalities

SOPRANO modulator depicted in figure 1 provides:

- DRM modulation according to DRM standard and associated standards (see References);
- 148.5 kHz - 27.0 MHz output range;
- all A/B/C/D DRM modulation modes supported;
- All 4.5/5/9/10/18 and 20kHz bandwidths supported;
- MDI/DCP interfaces;
- Integrated GPS receiver for SFN synchronisation;
- Digital audio input and analog audio input for AM modulation;
- Simulcast modulation option;
- HTTP control;
- LCD front panel option;
- SNMP alarms reporting and control;



**Figure 1: Block diagram.**

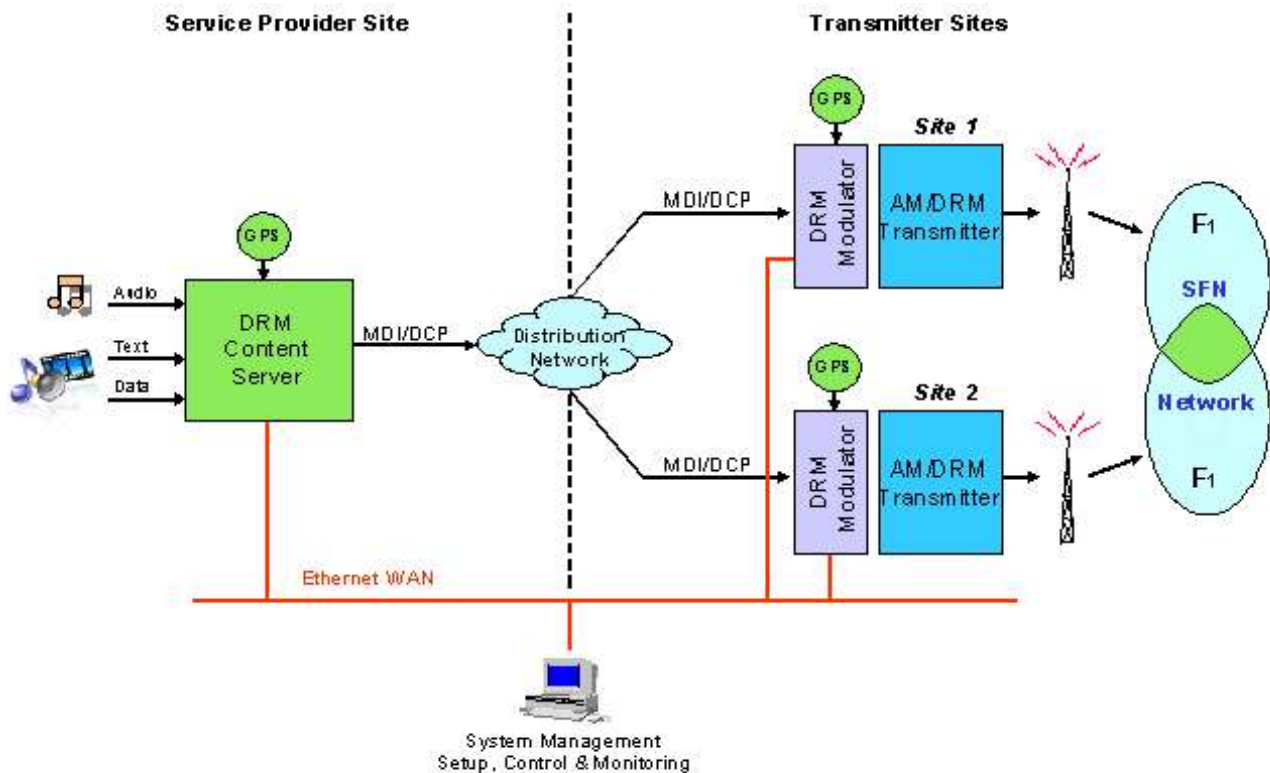


Figure 2: System implementation

## 3.2 Input interfaces

A three-digit label [xxx] enables to locate each connector (see Appendix).

### 3.2.1 Ethernet inputs

- Ethernet 1 [100]:
  - RJ45 (10/100baseT)
  - MDI protocol,
- Ethernet 2 [101]:
  - RJ45 (10/100baseT)
  - MDI protocol,

### 3.2.2 Audio inputs

- AES AUDIO IN [102]:
  - XLR Female
  - AES/EBU
- ANALOG AUDIO IN [103]:
  - XLR Female

### 3.2.3 Internal GPS receiver

- GPS ANT. IN [104]:

- GPS Signal Input
- Output power supply of the active antenna
  - Voltage: 5V
  - Current: 50 mA max.
- GPS TNC connector (50  $\Omega$ )

### 3.3 Output interfaces

- ENVELOP OUT [105]:
  - Analog signal with adjustable level and offset
  - XLR Male
- CARRIER OUT [106]:
  - Phase modulated square-signal with 5V level
  - BNC female connector

### 3.4 Control/Monitoring ways

#### 3.4.1 Ethernet

- Ethernet [100]:
  - RJ45 (10/100baseT)
  - SNMP (V1 et V2c), FTP and HTTP protocols
- Ethernet [101]:
  - RJ45 (10/100baseT)
  - SNMP (V1 et V2c), FTP and HTTP protocols

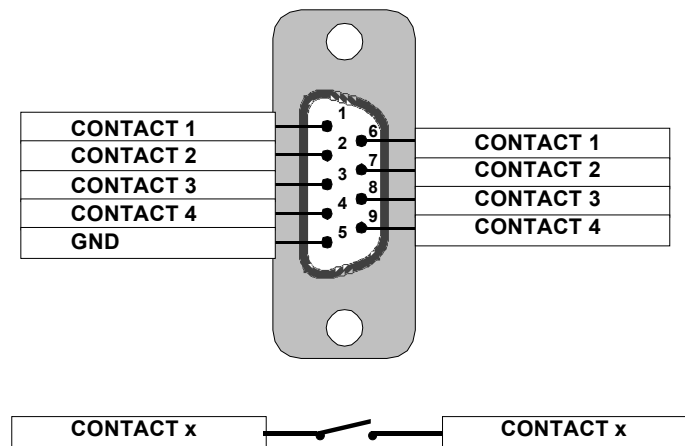
#### 3.4.2 DB9 debug port

- RS232 connector [107]:

#### 3.4.3 DB15 female connector Relay contacts

- Alarms connector [108]:
  - DB9 female connector
  - Each contact is connected to a relay contact
  - Maximum voltage = 30V DC
  - Maximum current = 0,2A DC
  - Maximum voltage between open contacts: 400V AC (50Hz),





**Figure 3: Alarm connector pin-out .**

In a normal errorless operation all the contacts are closed.

Alarms are signalled by open contacts.

When the equipment is not under power, all relay contacts are opened (alarm state).

The alarm contacts can be dedicated to any kind of error combination using the PC control software.

- Contact 1, 2, 3 : programmable alarm conditions
- Contact 4 : power supply alarm

The power supply alarm is active when at least one power supply voltage is out of operation.

#### 3.4.4 LEDs on the Front panel

SOPRANO equipment can detect many types of alarms. A summary of these alarms is displayed on the front panel. Alarms are grouped in two categories:

- Fault [200]: critical input error(s)
- Warning [201]: any non-critical alarm(s)

Fault LED is switched on when one of the following alarms is detected:

- MDI input error,
- Unsynchronized GPS in SFN mode,
- System error: software problem detected,
- Hardware problem: hardware problem detected,

Warning LED is switched on when one of the following alarms is detected:

- Unlocked GPS in SFN mode,
- Test mode activated,

The details of the alarms and the warnings are given through the SOPRANO control software.

Power LED [202] is switched on when SOPRANO is switched on.

## 3.5 Power requirements

### 3.5.1 Main voltage specifications

The DIGIDIA equipment can be operated within the following ranges:

Input voltage	Frequency
85 to 264 volts	47 to 63 Hz

### 3.5.2 Fuse Protection

Two fuses are located on the rear panel, inside the main socket [110], and identified by the label F1/F2. These fuses must be replaced by (or equivalent fuses):

Main voltage	Part N°	Rate	Manufacturer	Size
110/230 VAC	F1T2A	2A / 250V slow blow	CEHESS	5 x 20 mm

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## WARNING

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Equipment must be switch off and main line supply disconnected to network before all open operation or only by qualified staff.


## 3.6 Safety requirements

Equipment connected to the mains by plug on TN or TT power systems, socket-outlet shall be installed near the equipment and shall be easily accessible.

Class I equipment (only connected to a socket-outlet with a protective earth connection).

Installation category II.

Pollution degree 2.

The SOPRANO equipment must be connected to earth  in accordance to CEI364 (NFC15-100).

## 3.7 EMC compliance

The SOPRANO equipment complies with the European Directives for Electromagnetic Compatibility (EMC 89/336/EEC).

The equipment complies with the EN55022-B class and the EN50082-1 standards.

EMC characteristics can be guaranteed only if input / output cables with appropriate shielding are used.

It is necessary to establish a direct short connection between the earth connection point of the rack and any grounding point available on the bay or chassis in which the system is installed in order to meet EMC constraints.

## 3.8 Transport requirements

Use only the original packing for the transport of any equipment.

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## WARNING

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The SOPRANO remains under guarantee only if this condition is met.

### 3.9 Storage requirements

Recommended storage temperature	-20° C and +70° C.
Recommended relative humidity	10 to 80 % at 50°C

### 3.10 Environmental requirements

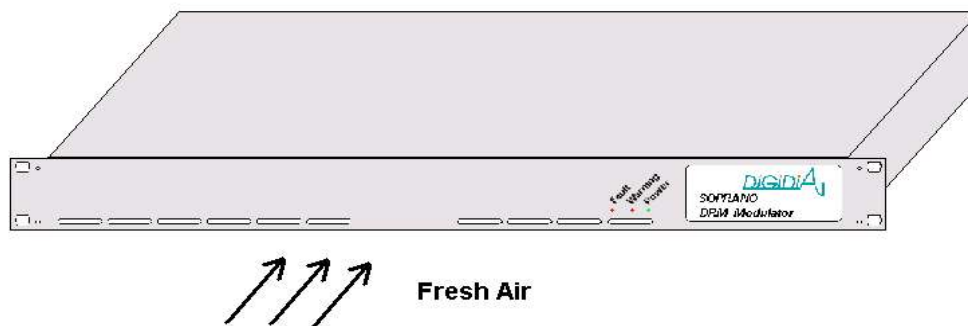
#### 3.10.1 Temperature

Correct operation of the SOPRANO equipment is insured in an ambient temperature between the following limits: + 0°C and + 50°C.

Power dissipation of the product with all options installed does not exceed 20 W.

#### 3.10.2 Cooling

An internal fan cools SOPRANO. The airflow is entering the unit through the front panel and ejected through the rear panel.



#### 3.10.3 Altitude

The SOPRANO equipment can be used from sea level up to 4000 m over sea level.

### 3.11 Mechanical Characteristics

#### 3.11.1 Weight and dimensions (SOPRANO only).

- Weight: 5 kg
- Dimensions (W x D x H): 0.483 m (19") x 0.450 m x 0.044 m (1 U)

#### 3.11.2 Weight and dimensions (SOPRANO in its original packing, ready for shipment).

- Weight: 7 kg
- Dimensions (WxDxH): 0.570 m \* 0.570 m \* 0.170 m

## 4 GETTING STARTED

### 4.1 Unpacking the SOPRANO rack

Check the packing against transport damage. If it is the case, please contact the carrier immediately. Be careful while unpacking, the equipment may be heavy and must be handled with care.

Keep the original packing for further transport.

Check the equipment against transport damage.

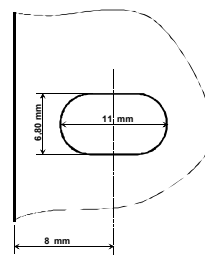
Check if the expected electric cable and the user manual are provided.

### 4.2 First start up

The equipment must be installed in a 19 inch bay.

Several holes are available on the front panel to tighten the rack inside the cabinet, as presented in the following diagram.

#### DRAWINGS



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#### **WARNING:**

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Service work described in this paragraph must be carried out by trained staff.

Because of the weight of the rack, mounting it into a cabinet requires the rack to be supported by rails and not by the front panel only.

1. Install all necessary cables.
2. Make sure the equipment is correctly grounded.
3. Make sure the air flow around the equipment permits an optimal cooling. (Do not obstruct the blower output). No other equipment should be installed directly under and above the SOPRANO equipment.
4. Connect the power supply

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#### **WARNING:**

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To prevent damage to the equipment, check the main voltage, current and frequency available which must be in the range of DIGIDIA specifications.

1. Switch on your device

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**WARNING:**

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**SOPRANO can be controlled using a web browser installed on a computer. See Appendix for the configuration of the computer. On line help is available for every menu.**

The **default settings** are the next :

- IP address port 1: **10.64.0.1**
- IP address port 1: **10.16.0.1**
- Subnet Masks : **255.240.0.0**
- Gateway : **10.64.0.1**
- Equipment name : **SOPRANO**
- Equipment comment : **NO COMMENT**
- User/Password : **public/public** (level 1); the level 1 is the less restricted access level.
- Maximum Network Delay : **10 s**
- LogFile : no event

## 5 MAINTENANCE

### 5.1 Reading the log file

SOPRANO includes a log file in which the 256 last events are stored. Use the web browser to read it.

### 5.2 Updating the firmware

Use the web browser to update the firmware. Read the on line help for more information.

### 5.3 First level maintenance

Because of the digital technology used in the DIGIDIA equipment, the first level maintenance is restricted to an exchange of the whole equipment.

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**WARNING:**

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Make sure the operator has an easy and safe access to the equipment.

#### 5.3.1 Fuses replacement

Two fuses are located in the rear panel socket (see Appendix).

To check or replace them:

- Switch the equipment off,
- Remove the main cable,
- If the fuse(s) is (are) blown, replace it (them) by the original reference provided by DIGIDIA,
- When the fuses are back in their housing, connect again the main cable and switch the equipment ON,
- Check the equipment normal operation,
- Power supply check.

A staff trained by DIGIDIA can only do the internal power supply replacement. A specific replacement procedure provided by DIGIDIA must be used in this intervention.

#### 5.3.2 Rack replacement

See the following « Uninstalling the equipment » section.

#### 5.3.3 Uninstalling the equipment

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**WARNING:**

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Make sure the operator has an easy and safe access to the equipment.

Switch the equipment off, and remove its corresponding main cable.

Remove all other cables.

Remove all necessary screws, including its back plane screw.

Extract the unit from its housing by pulling out the unit by its front panel handles.  
In case the equipment is replaced by a spare one, see « First start-up » section.  
Check that the place is still safe for the operation of the rest of the equipment in the bay.

## **5.4 Precautionary maintenance**

### **5.4.1 Fan**

The life span of the fan is typically 45 000 hours (about 5.1 years). DIGIDIA recommends changing them every five years. Fan can be changed during operation (Ref. 412H from PAPST) but contact the DIGIDIA customer service.

### **5.4.2 Battery**

The battery that protects internal Real Time Clock must be change every ten years in case of spare device (Ref. CR1225 from RENATA). Please contact the DIGIDIA customer service.

## 6 APPENDIX

### 6.1 Glossary

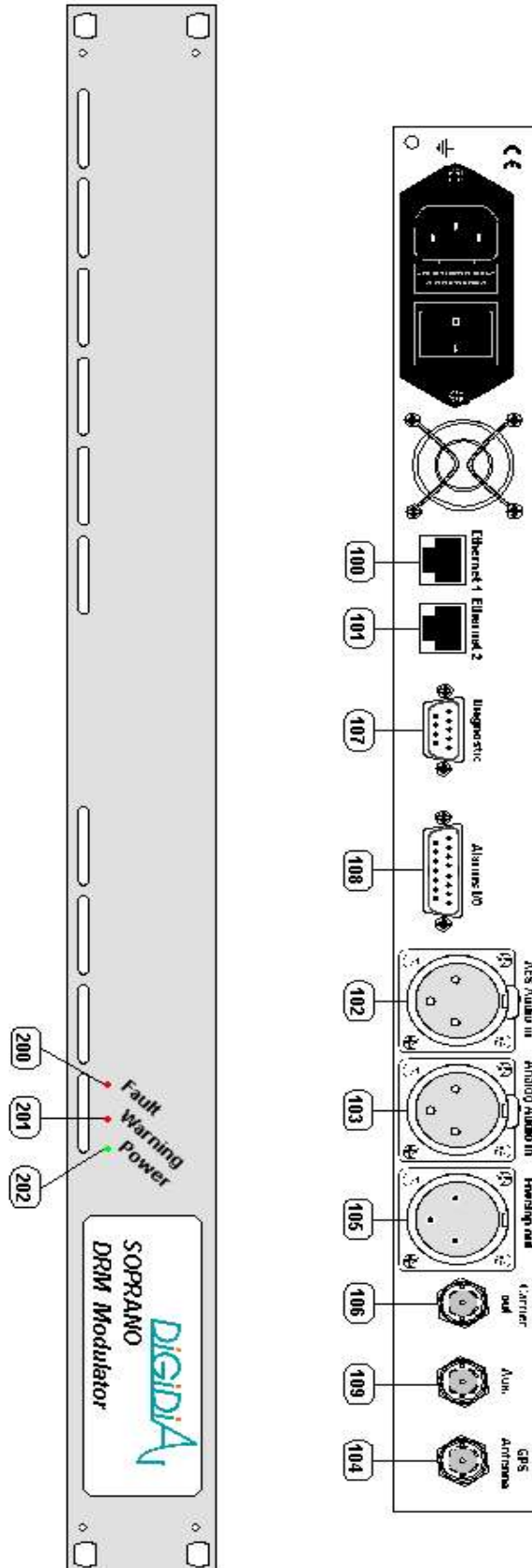
GPS	: Global Positioning System
http	: Hyper Text Transfer Protocol
SFN	: Single Frequency Network
SNMP	: Simple Network Management Protocol
TCP / IP	: Internet Suite of Protocols

### 6.2 References

- [1] ETSI ES 201 980: Digital Radio Mondiale (DRM); System Specification.
- [2] ETSI TS 102 820: Digital Radio Mondiale (DRM); Multiplex Distribution Interface (MDI).
- [3] ETSI TS 102 821: Digital Radio Mondiale (DRM); Distribution and Communications Protocol (DCP).
- [4] EN 55022-B: "Limits and methods of measurement of radio interferences characteristics of information technology equipment".
- [5] EN 50082-1: "Generic immunity standard –Part 1: Domestic commercial and light industry".



## 6.3 Front and rear panels



## 6.4 SOPRANO Control Software

SOPRANO can be controlled using a web browser installed on a computer.

### 6.4.1 System required

A computer with Windows (Millenium, NT, 2000 or XP) is required with Internet Explorer 6.0 (or higher) and JavaScript V1.5 installed.

A network board have to be installed on this computer with the next settings :

- **IP address** : 10.64.x.y with x and y different of the SOPRANO IP address ( $x \neq 0$  or  $y \neq 1$ ) in the case of the default IP address of SOPRANO (10.64.0.1)
- **Subnet Mask** : 255.240.0.0 corresponding to the default subnet mask of SOPRANO.

The connection between SOPRANO and the computer can be made directly with a RJ45 crossed cable.

To check to the good network settings, ping the SOPRANO device in a DOS window (ping 10.64.0.1).

### 6.4.2 Control the SOPRANO

To control SOPRANO :

- Launch Internet Explorer,
- Fill in the address field : <http://10.64.0.1> (10.64.0.1 corresponds to the default IP address of SOPRANO).

Automatically, the welcome page appears.

For more information about the control software, read the on-line help.

## 6.5 Warranty terms

### 6.5.1 Standard product warranty

This DIGIDIA product is warranted against defects in material and workmanship for a period of one year from date of shipment. During the warranty period, DIGIDIA will, at its option, either repair or replace products which prove to be defective, free-of charge.

For warranty service or repair, this product must be returned to DIGIDIA France. Buyer shall prepay shipping charges to DIGIDIA and DIGIDIA shall pay shipping charges to return the product to buyer.

Products returned for repair outside of the warranty period will be charged on a per unit basis. Per unit charges are established for each product repair as they arise.

On request, a customer / supplier contract may be established for extending these warranty terms on a yearly basis.

### 6.5.2 Limitation of warranty

The foregoing warranty shall not apply to defects resulting from improper or inadequate maintenance by Buyer, Buyer-supplied software or interfacing, unauthorized modification or misuse, operation outside of the environmental specifications for the product, or improper site preparation or maintenance.

## 6.6 Instructions in case of return to factory

In case you need to return your equipment to DIGIDIA for updating or maintenance, please use the following procedure:

- Call the hot line at DIGIDIA before shipping your equipment, in order to check whether it is really necessary to return it.
- The shipment back to DIGIDIA is organised by the customer and at his expense and DIGIDIA will organise and pay the return after repair to the customer's company. If you are part of an EEC country, the shipment is at your expense until DIGIDIA's premises. If you are outside EEC, the shipment is at your expense until RENNES SAINT-JACQUES airport (France).
- During the guarantee period, the repair is free of charge. If your equipment is out of guarantee and if you have no maintenance contract (\*), DIGIDIA will send you by fax a quotation for this repair that you have to acknowledge by sending the form back.
- Always use the original packing in which the equipment had been delivered to you.
- Do not return any documentation or cables (power cord or other).
- Use the attached form to explain the reason of the return and, when necessary, the problems encountered.
- Send the equipment to:

**DIGIDIA**

Support Department

Immeuble Orchis

Les landes d'Apigné

35650 LE RHEU - France

Tel: +33 (0)2 99 14 63 32

Fax: +33 (0)2 99 14 58 83

Email: [support@digidia.fr](mailto:support@digidia.fr)

(\*) If you want to set up a maintenance contract, please contact our sales department.



## Model of report for return to factory

**From:**

Telephone:

**Company:**

Telefax:

☐ Under guarantee

☐ Other ( quotation will be submitted)

☐ Under a maintenance contract

**Type of system:**

☐ SOPRANO

☐ ALTO

☐ DIAPASON

**Reason of return:**

☐ Update

☐ Upgrade

☐ Maintenance

**Type of problem:**

☐ Hardware

☐ Software

☐ Undefined

EQUIPMENT SERIAL NUMBER	FIRMWARE VERSION	PC SOFTWARE NAME/VERSION

EQUIPMENT SPECIFICITY (option, embedded boards, modem, etc.)




# ELECTROMAGNETIC COMPLIANCE

## STATEMENT

(EEC directive 89/336 article 10)

Manufacturer name: **DIGIDIA**

Address: **Immeuble Orchis  
Les landes d'apigné  
35650 LE RHEU - FRANCE**

Equipment designation: **XXXXXXX** SOPRANO

M. OLIVIER Pascal, Manager

**Declare having the strong presumption that the above designated equipment complies with the essential EEC89/336 directive requirements, by application of the standards listed below:**

NF EN 55022-B class

NF EN 50082-1

Le Rheu, August 2000



## SAFETY COMPLIANCE

STATEMENT

(EEC directive 73/23)

Manufacturer name: **DIGIDIA**

Address: **Immeuble Orchis  
Les landes d'apigné  
35650 LE RHEU - FRANCE**

Equipment designation: **XXXXXXX** SOPRANO

**M. OLIVIER Pascal, Manager**

Declare having the strong presumption that the above designated equipment complies with the essential EEC73/23 directive requirements, by application of the standards listed below:

NF EN 60950

Le Rheu, August 2005